Pavement Management Program

Town of Sanford, Maine

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Pavement Management Program
Town of Sanford, Maine

1. INTRODUCTION

During the winter of 2005-2006 the Public Works Department of the Town of Sanford committed to the development of a Pavement Management Program for the Town. This had been identified as a necessary step in strengthening the local process for planning highway improvements and for budgeting for maintenance of the Town's highway infrastructure. In the early summer of 2006, the project team consisting of

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commenced to perform a comprehensive study of Sanford's roadway network. Under the scope of this study, the project team set out to inventory and evaluate the pavement condition on all town maintained roads. The project team utilized the Road Surface Management System (RSMS) software package developed by the University of New Hampshire and employed by the Maine Department of Transportation's Local Road Management Program. The RSMS was used to provide tools and assist in the projection of future conditions and the preparation of a road maintenance program and budget.

A main focus of the project was to develop a system that would help the Town determine and prioritize necessary pavement repairs. Our study found Sanford's roads to be in fair condition. The highway department is doing a good job maintaining the rideability of its roads, especially in heavy maintenance and reconstructing roadways. However, it was noted that little is being done in the way of routine maintenance, especially cracksealing, which could be used to preserve pavements in a very cost effective manner. This is not a condition unique to the Town of Sanford. With the benefit of the results of this internal study, the Public Works Department and Engineering Department will cooperate to update its pavement management practices.

The software will also aid the Town in preparing its road program by prioritizing repairs and creating lists of suggested repairs under varying funding levels. It is intended that this will be updated on an periodic basis (one to three year intervals) to maintain a current assessment of pavement conditions and needs. This will assist in better predicting the ongoing capital needs.

2. METHODOLOGY

In the summer of 2006, the project team performed a detailed condition evaluation of approximately 136 miles of town maintained pavement. The first step was to identify the Town accepted streets, thereby comprising the roadway network. The second step was to further break each street in the roadway network into pavement management sections. The third step was to carefully categorize, measure, and record the individual pavement distresses within each pavement management section. Finally, the fourth step was to customize the road repair strategies within the infrastructure software through discussion and a field review with Town officials. All these steps were performed prior to the study of future funding scenarios.

Network Configuration

Network configuration builds an inventory of streets that describe the municipality's complete roadway network. The street name, street length, width, importance (reflecting traffic volume and place in the hierarchy), and pavement type are among the items identified at this initial phase in the pavement management process. The Town's street map and GASB34 inventory were used to check the network inventory and discrepancies were noted for correction.

Pavement Management Section Identification

In the field, the project team assessed the prevailing road conditions in accordance with the procedures specified in the RSMS guide, and as further elaborated by MDOT. Each street contains one or more pavement management sections, which were defined by the observed field conditions. When marked variations in condition were identified a new roadway section was labeled. This also included significant changes in pavement width. By way of example a pavement management section might be defined by the limits of previous construction or maintenance activities within each street. Segments are defined by having the same width, typical distresses, network importance etc. The object is to set up homogenous areas of pavement to aid in assigning the appropriate repair. A street might consist of a single section, or it may be comprised of several pavement management sections, depending on the field observations.

Surface Distress Assessment

For each pavement management section, the *severity* and extent of nine major pavement distresses are recorded, and then entered into a weighted formula to arrive at a Pavement Condition Index (PCI). The distresses are categorized as base related or surface related distresses. Base related distresses indicate that the subsurface soil strength is inadequate for the existing traffic load. Streets that show significant base related distresses may need to have the subsurface soils fortified with stone to strengthen the structure and/or the street may need a significantly thicker layer of pavement. Surface related distresses are caused by age and weathering of the pavement. Streets that have predominantly surface related distresses are excellent candidates for maintenance sealing to inhibit further pavement oxidization (the main effect of aging). Streets with more of the base related distresses will most likely need some full depth patching, structural overlays or reclamation/reconstruction.

The four base related distresses are:	The five surface related distresses are:
Potholing or non-utility patching	Block cracking
Alligator cracking	Transverse or longitudinal cracking
Distortion	Bleeding or polished aggregate
Rutting	Surface wear or raveling
	Shoving, slippage or corrugation

Pavement Condition Index (PCI) Defined

A PCI was generated for each inventoried pavement management section using the surface distress data collected . PCI is measured on a scale of one hundred to zero, with one hundred representing a pavement in perfect condition and zero describing a road in impassable condition. Through the RSMS software each type of observed pavement distress is assigned a deduct value based on the type, severity and extent of the defects itemized in the field investigation. A more severe distress type, such as potholing, has a higher deduct point value than a lesser distress such as transverse cracking. In general, base related (pavement foundation) distresses are weighted more heavily than surface related distresses. A weighted sum of the deduct points is then subtracted from the perfect "one hundred" road in order to generate a PCI for each roadway segment.

The Repair Categories and Strategies

The RSMS software uses alternative repair categories and strategies to be applied to the data base. The individual communities using the software are able to designate the repair options that are practical for their environment. In our application, the repair types or categories allow for the manipulation of alternative repair scenarios to come up with a most relevant and tailored evaluation. Repair categories are a useful tool to summarize data on a Town-wide basis. An individual road segment will fall into a particular category based on the strategy table's output of repair types and will vary due to functional classification. The goal is to gain a broad understanding of the existing conditions in simple yet meaningful terms. The following table gives a concise summary of the relationship between PCI, repair category, and type of repair activities to be considered:

Table 1 - Repair Category Descriptions

REPAIR CATEGORY	PCI*	Description
DO NOTHING	93-100	Excellent condition - in need of no maintenance.
ROUTINE MAINTENANCE	86-92	Very good condition - may be in need of crack sealing or minor localized repair.
PREVENTIVE MAINTENANCE	73-85	Good condition -- pavement surface may be in need of surface sealing, full depth patch and/or crack sealing.
MAINTENANCE		
STRUCTURAL IMPROVEMENT	61-72	Fair condition - pavement surface structure in need of added strength for existing traffic. Typical repairs are overlay with or without milling.
BASE REHABILITATION	0-60	Poor condition -- in need of base improvement. Typical repairs are reclamation or full depth reconstruction.

The repair categories point toward the repair strategies that will be considered. The strategies that we employed are cracksealing, 1" shim, 1"shim and 1" overlay, 1.5" overlay, 2"overlay, reconstruction (grind, shape and compact with 2" base and 1"finish coats), and defer maintenance. An individual road segment will fall into a particular category based on the strategy table's output of repair types and will vary due to functional classification.

Preparing Budget Scenarios

Once the Pavement conditions were inventoried and analyzed, the repair strategies were determined. The impact of alternative maintenance programs on the street network were assessed. Typically, these studies can range from 1 to 20 year increments, however, for the purpose of this report 10-year increments are used. In this case the year ten maintenance will subsequently be rolled into the next ten year program, and will be supplemented by additional maintenance to deteriorating roads. The purpose of the budget planning process is to determine the impact of various maintenance programs on spending levels to find a funding level that will best meet the Town's needs. The RSMS software uses deterioration curves, unit costs, and the strategy table developed in the repair strategy definition phase to assign each street a repair *type* and associated cost for each year of the study. The program also assigns each street a benefit value that is used to determine which streets the software assumes will be repaired each year. This information is then adjusted by staff to convert it into a program that reflects various spending commitments. **It is important to understand that the Road Surface Management System is a network-wide planning tool, and is not intended to give definitive street-by-street repair data, so field verification and more detailed project scoping and cost estimating will be performed as the continuous CIP budget process moves forward from year to year.**

Strategy Table

The RSMS uses a table of repair strategies to assign specific road repair *types* to individual roadway segments. The repair strategy table incorporates PCI and other roadway characteristics and conditions to simulate decisions consistent with the Town's repair practices and procedures.

Benefit Value Defined

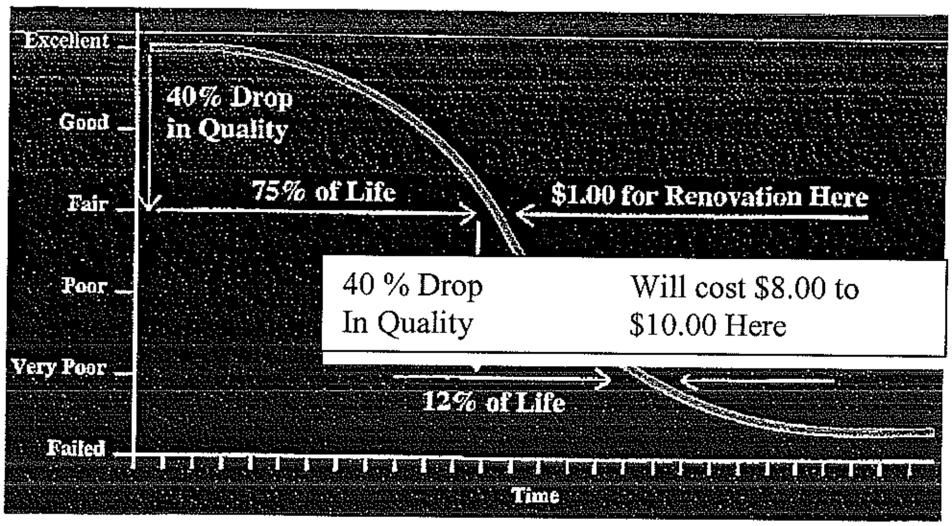
The budget analysis process within RSMS prioritizes needed system repairs based on the estimated "Benefit Value" or "Value". The Benefit Value formula is calculated using variables representing traffic volume or "road importance", repair service life, PCI, and unit repair costs for each pavement management section. For each plan year, the software prepares a future Pavement condition projection. Due to limitations in the software, we created an excel program to adjust the recommended annual program and associated budgets. . The system also allows the user to enter an inflation rate to account for estimated increases in future year construction costs. A 4% inflation rate was used.

The Benefit Value prioritization process generally favors cost effective maintenance alternatives. Repair actions are typically delayed on those sections that require reconstruction or major rehabilitation because the benefits for dollars spent are generally lower than maintenance candidates. After the relatively good roads are "saved", improvements are directed toward the poorer roads.

Pavement Management Concept

The development of an integrated pavement management system is a formalized approach to cost effectively allocate road maintenance and repair budgets. The theory of pavement management is based on accurately predicting accelerated roadway deterioration. Figure 1 illustrates the key concept of making timely maintenance repairs, thereby averting the need for far more expensive and extensive structural repairs. This pavement Deterioration Curve presents the findings generally agreed to by Highway Engineers. It shows that a roadway deteriorates from excellent to fair condition during the first 75% of its life, after which point it rapidly declines in quality. Maintenance at this point can avoid more costly repairs only a few years later. The goal is to save money in both the short and long run *by* developing a road repair program that <u>minimizes</u> expenditures while meeting the overall road program goals of maintaining roads in the most serviceable condition for the least amount of money. In essence it attempts to use the limited financial resources wisely.

Figure 1 – The Pavement Deterioration Curve



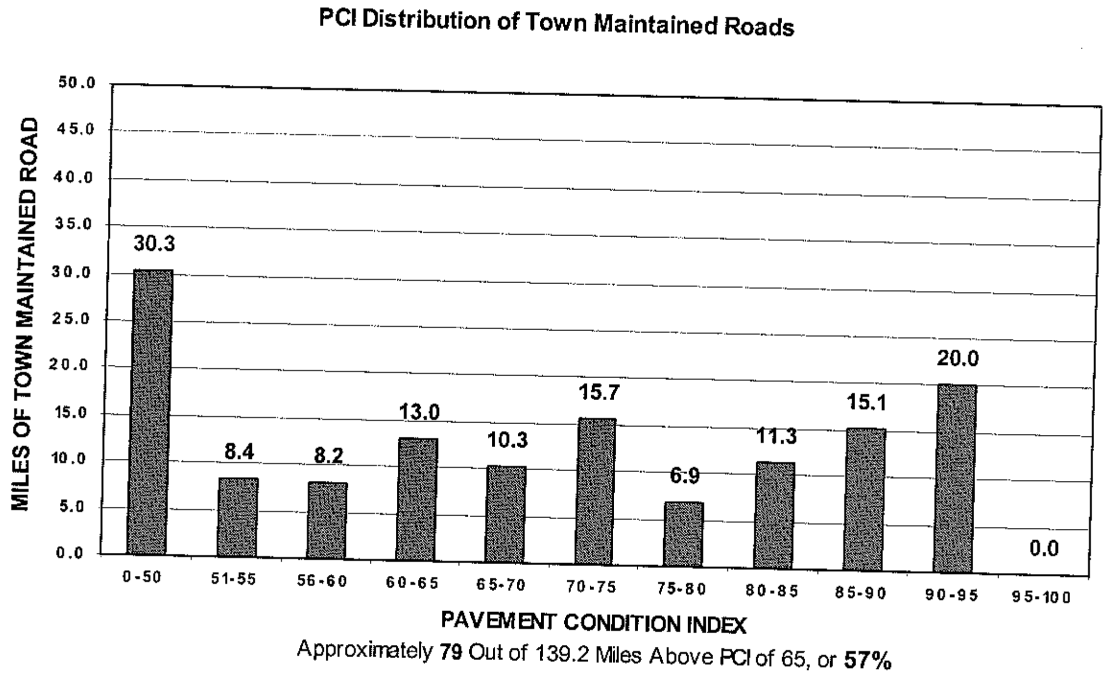
The procedure is to collect, organize, and maintain a complete roadway database that describes a particular road system. A pavement management system is restricted to pavement surface data. While some systems also include data on drainage, sidewalks, traffic signs, utilities, and other roadway elements, it was decided to employ the RSMS program supported by MDOT for Sanford's initial steps into this form of management tool.
This new database will be used as a repository of historical and descriptive data on the road network. Data in the roadway database provides useful input for accurately reporting on and evaluating current network conditions, forecasting life cycle costs for different maintenance and repair treatments, and developing annual and long range budgets and repair plans.

The ongoing effort to establish and perpetuate a pavement management program is an acknowledgement that the Town has a major investment in its approximate 155 mile Town accepted street network. It is easy to forget that roadways are a community's single largest investment. New construction and repairs to existing infrastructure are very costly, and prudent fiscal management suggests that it makes economic sense for a community to protect that investment over time for current and future residents. It is anticipated that this tool will aid in the planning of highway improvements by the Public Works Department as well as assist the policy makers as they grapple with the difficult financial decisions that must be made.

3. CURRENT CONDITIONS

Existing Pavement Conditions

The average PCI for Sanford's road network is 69. The chart below demonstrates the distribution of miles by PCI for all of the Town streets. The chart shows a wide range of conditions with no heavy concentrations. 33% of the roads have a PCI at 60 or below. These roads are in poor condition, indicating that they will require base improvement, and there is a significant amount of investment required to restore these roads to a desirable condition. Approximately 20% of the roads are in fair condition. These roads will require investment, since most of them will at least require pavement overlay to add strength to the road surface. 23% of the roads are in good condition and will require preventive maintenance. The remaining 24% of the roads are in very good condition and should require low levels of routine maintenance.

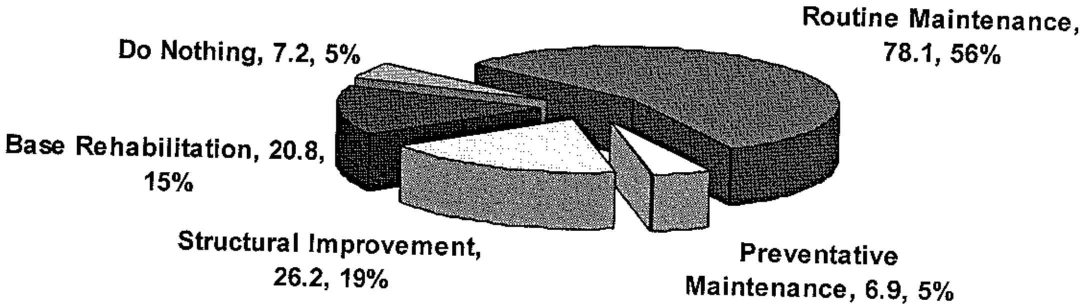


Applying the five repair categories (Table 1) to the Town's street network, the following table *gives* the miles and dollars associated with each repair category for today's conditions.

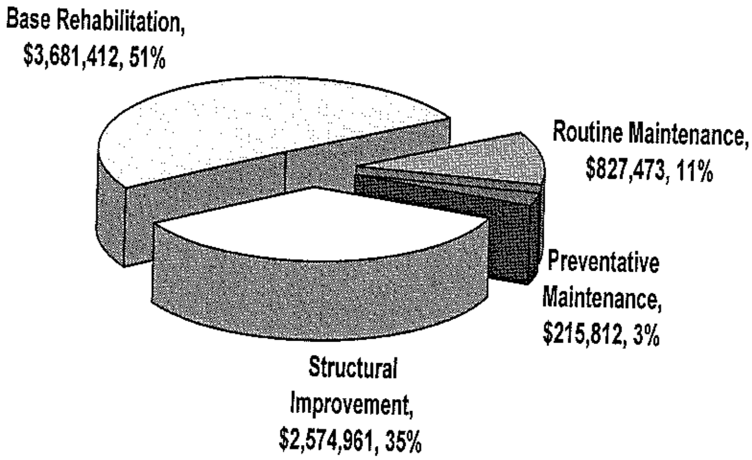
Table 2 - Summary of Miles and Dollars for Town Maintained Streets

	Miles	% of Miles	Cost	% of $
Do Nothing	7.2	5%	0	0%
Routine Maintenance	78.1	56%	$827,473	11%
Preventive Maintenance	6.9	5%	$215,812	3%
Structural Improvement	26.2	19%	$2,574,961	35%
Base Rehabilitation	20.8	15%	$3,681,412	50%
Total	139.2	100%	$7,299,658	100%

Miles of Outstanding Work for Town Maintained Streets



Dollars of Outstanding Work for Town Maintained Roads



Figures 2 and 3 show that while Base Rehabilitation represents only 15% of the miles, it comprises 50% of the outstanding cost. While continued maintenance will prevent more roads from slipping this expensive repair category, Sanford should reconstruct these roads as funds allow.

4. BUDGET ANALYSIS

Sanford has a public road system of approximately 155 miles. We have analyzed approximately 139 miles, which is exclusive of state maintained highways, federal aid highways and private roads. Discounting the costs of signs, traffic signals, significant drainage, curbing or sidewalks, it would cost approximately $98 million in today's dollars to replace the town accepted roadway infrastructure. It is easy to forget the value of the town roadways are one of the community's largest investments. In its financial statements, the Town's Auditor shows depreciation for the Town's road infrastructure in the range of $1.5 Million Dollars per year. This number may mean different things to different individuals, however, one of the things that it does say to everyone is that the road network deteriorates each year.

The study identified approximately $7,300,000 in road maintenance projects over a ten year period, and developed a work program using RSMS, which should become the basis for the ongoing Capital Improvement Program process that the Public Works Department will adhere to. As stated earlier, excluded from this amount are state maintained roads, and roads on the Federal Aid Highway System for which we hope to find funds that do not have to come out of the local budget. As major projects might develop in cooperation with MDOT, specific funding for those projects would be requested in addition to the RSMS analysis. Simple analysis of the network needs over a ten year period indicates that the expenditure of $730,000 per year would be required to manage the problem.

Since it is not anticipated that the Town is able to fund at the level needed, four nine-year scenarios have been examined to schedule road repairs based upon various funding levels. The tenth year of each scenario represents the backlog of needed repairs and costs that will be rolled into the subsequent ten year program. Each Scenario is based upon the allocation of $140,000 per year in Operations and Maintenance (O&M) funds for maintenance paving, increasing to $190,000 per year in 2016. This represents an annual increase of 4% per year in that component of the O&M budget. The CIP funding for the three scenarios has been adjusted to show the levels of investment that will sustain the Town's road infrastructure. The following charts demonstrate the level of CIP funding associated with each scenario and the corresponding network PCI.

The scenarios are summarized in the following tables, which indicate in year ten, the total work remaining to be carried over into the next ten year period. This can be thought of as the backlog of funds needed to complete the necessary repairs.

Scenario One

	PCI	TOTAL	O&M	CIP
YEAR	69	COSTS		
2008	72	487,130	$140,000	$347,130
2009	75	467,925	$145,600	$322,325
2010	73	551,633	$151,424	$400,209
2011	76	496,644	$157,481	$339,163
2012	79	475,341	$163,780	$311,561
2013	78	456,508	$170,331	$286,176
2014	77	506,831	$177,145	$329,686
2015	82	423,618	$184,230	$239,387
2016	82	399,861	$191,600	$208,262
2017	89	3,034,167	$199,264	$2,834,904

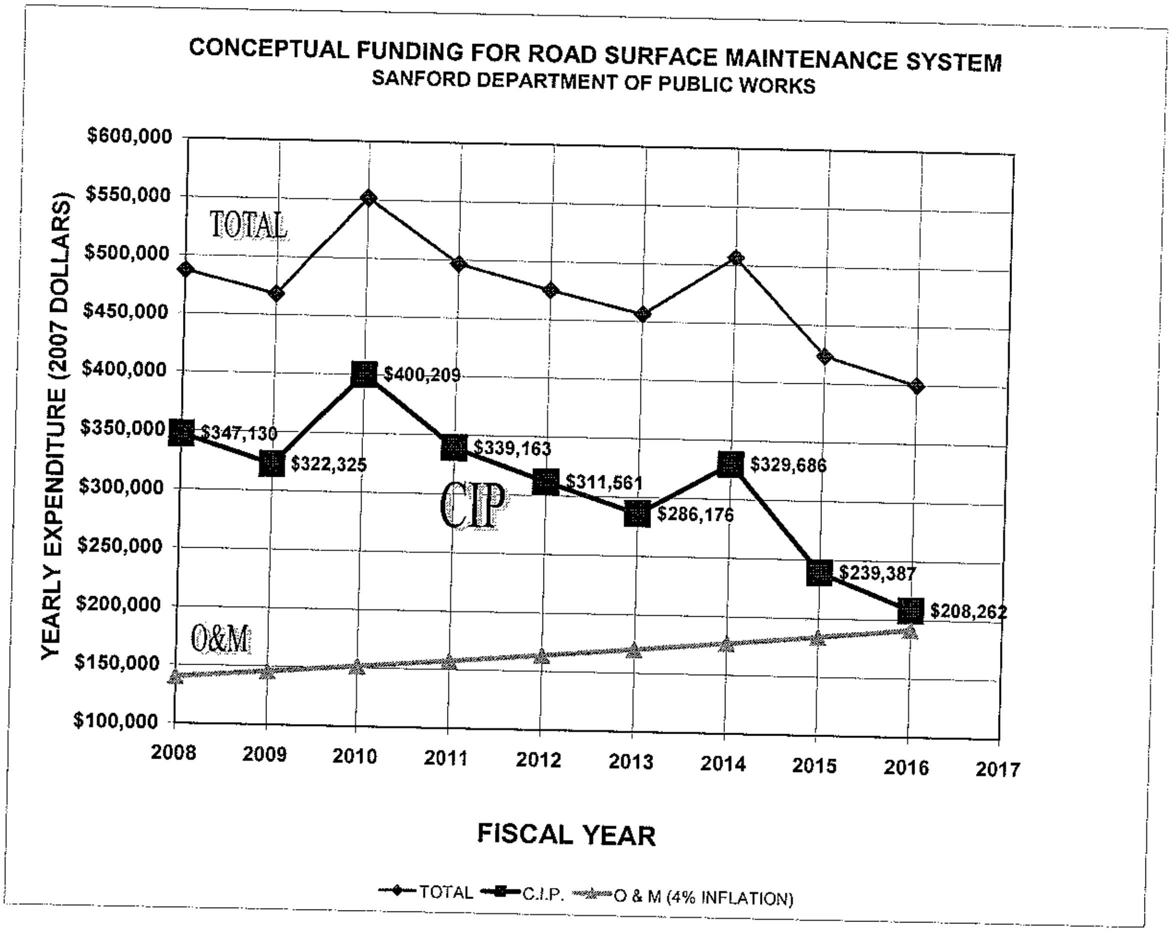
Scenario Two

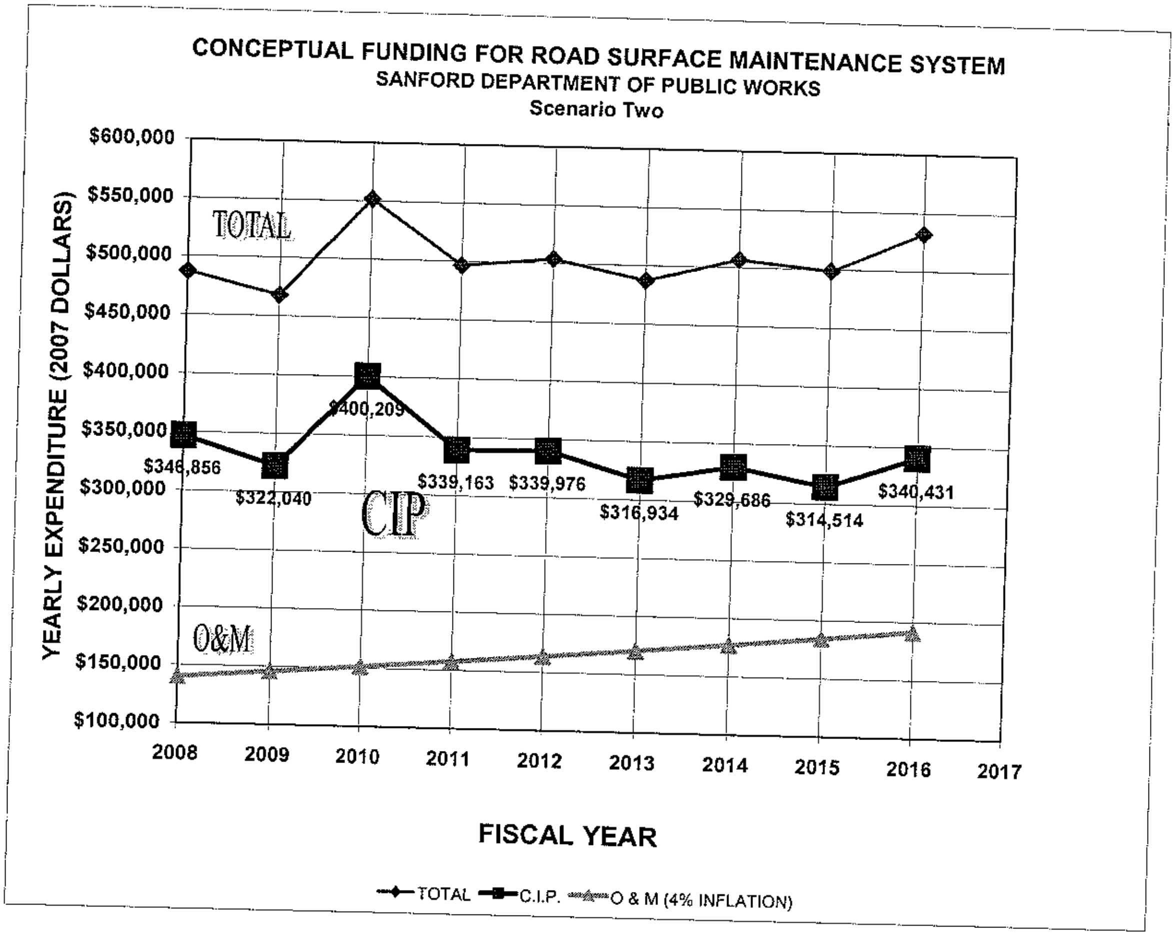
YEAR	PCI	TOTAL	O&M	CIP
2007	69	COSTS		
2008	72	486,856	$140,000	$346,856
2009	75	467,640	$145,600	$322,040
2010	73	551,633	$151,424	$400,209
2011	76	496,644	$157,481	$339,163
2012	79	503,756	$163,780	$339,976
2013	79	487,266	$170,331	$316,934
2014	78	506,831	$177,145	$329,686
2015	82	498,744	$184,230	$314,514
2016	83	532,031	$191,600	$340,431
2017	89	2,779,473	$199,264	$2,580,209

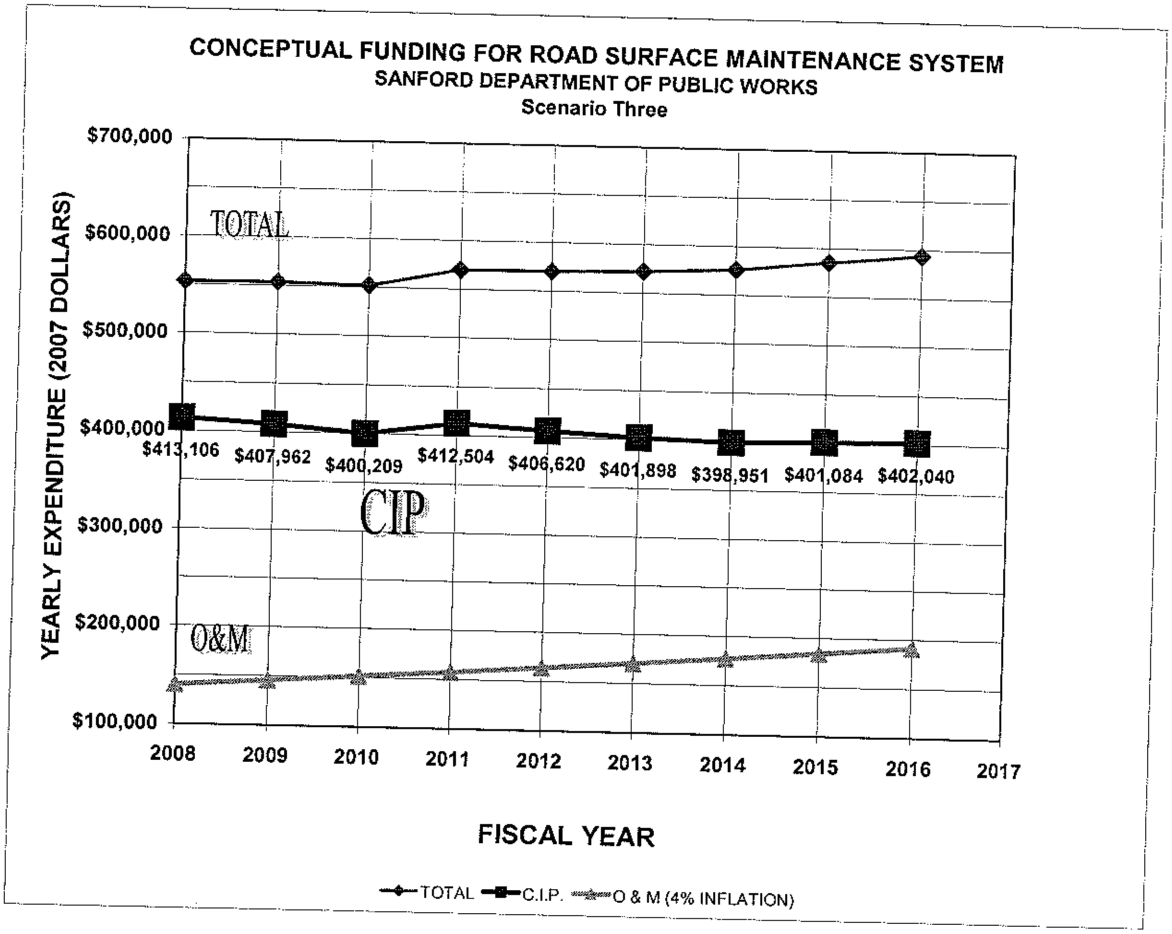
Scenario Three

YEAR	PCI	TOTAL	O&M	CIP
2007	69	COSTS		
2008	73	553,106	$140,000	$413,106
2009	76	553,562	$145,600	$407,962
2010	75	551,633	$151,424	$400,209
2011	77	569,985	$157,481	$412,504
2012	79	570,400	$163,780	$406,620
2013	79	572,230	$170,331	$401,898
2014	79	576,095	$177,145	$398,951
2015	83	585,315	$184,230	$401,084
2016	84	593,640	$191,600	$402,040
2017	89	2,151,397	$199,264	$1,952,133

The following charts graphically represent the dollar investments and PCI achieved by the various scenarios discussed.

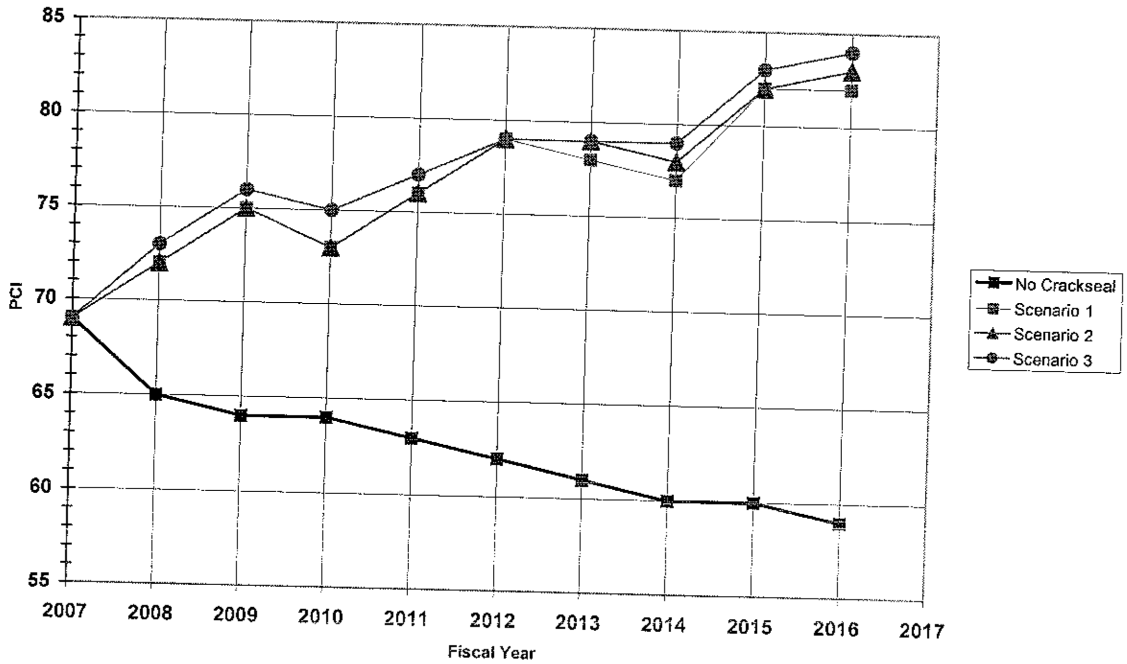

CONCEPTUAL FUNDING FOR ROAD SURFACE MAINTENANCE SYSTEM
SANFORD DEPARTMENT OF PUBLIC WORKS
YEARLY EXPENDITURE (2007 DOLLARS)
$600,000
$550,000
$500,000
$450,000
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
TOTAL
CIP
O&M
$347,130
$322,325
$400,209
$339,163
$311,561
$286,176
$329,686
$239,387
$208,262
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
FISCAL YEAR
TOTAL
C.I.P.
O & M (4% INFLATION)


CONCEPTUAL FUNDING FOR ROAD SURFACE MAINTENANCE SYSTEM
SANFORD DEPARTMENT OF PUBLIC WORKS
Scenario Two
YEARLY EXPENDITURE (2007 DOLLARS)
$600,000
$550,000
$500,000
$450,000
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
TOTAL
CIP
O&M
$346,856
$322,040
$400,209
$339,163
$339,976
$316,934
$329,686
$314,514
$340,431
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
FISCAL YEAR
TOTAL
C.I.P.
O & M (4% INFLATION)


CONCEPTUAL FUNDING FOR ROAD SURFACE MAINTENANCE SYSTEM
SANFORD DEPARTMENT OF PUBLIC WORKS
Scenario Three
YEARLY EXPENDITURE (2007 DOLLARS)
$700,000
$600,000
$500,000
$400,000
$300,000
$200,000
$100,000
TOTAL
CIP
O&M
$413,106
$407,962
$400,209
$412,504
$406,620
$401,898
$398,951
$401,084
$402,040
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
FISCAL YEAR
TOTAL
C.I.P.
O & M (4% INFLATION)

The following graph illustrates the road system PCI by year for the three scenarios, as well as a fourth scenario depicted as "No Crackseal". Reviewing the graph one will see that the PCI for all three scenarios are in the same range. The "No Crackseal" PCI demonstrates dramatically the impact that cracksealing has on preserving the road system. Each of the Scenarios maintains a significant dollar investment in cracksealing, on the order of $100,000 per year. We would review the impact that cracksealing has on individual roads in year three following the application of the crack seal to determine if and when a reapplication would be appropriate. Bear in mind that cracksealing does not repair the road surface, and is used to slow the deterioration of the road. This allows some protection of the road network, however, in Sanford's case we have many roads that are already past the point of cracksealing, represented by PCI's below 60. It is likely that the cracksealing strategy will be refined to find the area where dollars can be invested in road structural improvements and base rehabilitation while maintaining the overall PCI of the system. This would likely translate into program of spending that would allocate on the order of $50,000 per year to cracksealing.

Comparison
PCI Over Time by Scenrio



As the CIP process is continues from year to year, the road network conditions will continue to be analyzed. This methodology would continue to be employed to update the road program and to continue looking to the future. Remember that the road system's condition is dynamic, and we will never reach the state where we are caught up with no work remaining. Every year the data base should be updated, and the road conditions should be re-inventoried on three year intervals to update project needs.

5. Concluding Remarks

The help of Robert Strobel at the University of New Hampshire and of the Maine Department of Transportation are greatly appreciated. UNH provided assistance in updating and modifying the software to render it more useful to the Town's project, and MDOT provided the software through its Local Roads Center in its original format.

Sanford has a road network that is valued at close to $100 Million. This network is in a general condition on the poor side of fair. The strategy that has come out of this study will maintain and gradually improve the conditions of the system. The Town must continue to monitor the conditions of the system, and coordinate the CIP requests as the dynamics of the network conditions change. It will be a challenge for the Town to find the dollars needed. The investment to radically improve the current conditions is approximately double the level of the existing investment.

Appendix

Major Structural Repair Projects
By Scenario

Scenario 1 - Scheduled Major Structural Repair Projects
SANFORD MAINE

		Year				Year	
Nancy Avenue	CP2	1	$32,944	Hansons Rge Rd-1	10BS2	7	$389,095
Jagger Mill Road-1	HM2	1	$24,412	Sherburne Street-SPR	RC3	7	$61,523
Kimball Street -2	HM2	1	$32,324	Hammond Street	HM1.5	8	$9,008
Bethany Drive	18BS3	1	$22,165	Irving Street	HM1.5	8	$9,205
Beacon Street	RC3	1	$12,096	North Cotswald Street	HM1.5	8	$7,862
Jagger Mill Road-2	RC3	1	$169,804	Bates Street	HM2	8	$30,050
North Street	RC3	1	$35,901	Beaconsfield Street	HM2	8	$10,483
Twombley Road -1	RC3	1	$135,283	Cotswald Street	HM2	8	$10,483
Twombley Road -2	RC3	1	$96,752	Dogwood Lane	HM2	8	$17,471
Kennebunk Road 2	HM2	2	$46,902	Hughes Street	HM2	8	$9,165
Kennebunk Road 3	HM2	2	$65,775	Theriault Street	HM2	8	$10,483
Ridley Road -2	RC3	2	$42,057	Bradeen Street	RC3	8	$19,857
Twombley Road -3	RC3	2	$314,711	Ellsworth Street	RC3	8	$50,967
Bennett Court	HM1.5	3	$4,152	Edmund Street	HM1.5	9	$7,563
July Street-1	HM2	3	$11,551	Essex Street	HM1.5	9	$35,772
July Street-2	HM2	3	$13,705	Fieldstone Lane	HM1.5	9	$24,427
Berwick Road	RC3	3	$80,976	Grove Street	HM1.5	9	$14,990
Pleasant Street	RC3	3	$145,102	Highland Street	HM1.5	9	$6,916
Bennett Street	HM1.5	4	$22,194	Riverbank St	HM1.5	9	$9,709
Harding Street	HM1.5	4	$15,625	Riverview St	HM2	9	$10,902
Sunset Road -1	CP1	4	$71,522	Sacopee Road	HM2	9	$49,967
Charles Street	HM2	4	$22,748	Emerson Street	RC3	9	$103,716
Industrial Drive	HM2	4	$7,000	Grammar Street-1	RC3	9	$26,006
June Street-1	HM2	4	$45,064	Autumn Street	SHL	4	$5,438
June Street-2	HM2	4	$43,571	Andrew Avenue	SHM	1	$24,530
Stackpole Court	HM2	4	$9,343	Birch Street	SHM	1	$13,147
Berwick Avenue	10BS2	4	$16,597	Brock Avenue	SHM	4	$6,039
Brook Street -2	RC3	4	$39,772	Crossing Brook Road	SHM	8	$10,745
Oak St. Springvale-1	RC3	4	$56,810	Deborah Avenue	SHM	1	$25,467
Boothby Avenue	HM1.5	5	$9,208	Grammar Avenue	SHM	8	$6,359
Brookwood Avenue	HM2	5	$8,940	Lavin Court	SHM	4	$9,731
Camire Avenue	HM2	5	$9,716				
Deering NBhood Rd	HM2	5	$126,313				
High Street -3	HM2	5	$72,092				
Roberts Street	HM2	5	$31,082				
Country Club 1	RC3	5	$57,358				
Kimball Street -1	RC3	5	$27,732				
George Street	HM1.5	6	$6,471				
Daylight Avenue	HM2	6	$14,564				
Cheney Street	RC3	6	$16,733				
River Street	RC3	6	$328,037				
Upper Elm Street-1	RC3	6	$49,382	**TOTAL***			**$3,421,559**

* Does not include roads that were just cracksealed or patched

Legend

RC3	Reclaim, 3" Hot Mix	18BS3	18" Base Replace, 3" Overlay
HM2	Hot Mix 2" Overlay	10BS3	10" Base Replace, 3" Overlay
HM1.5	Hot Mix 1.5" Overlay	SHL	Hot Mix Shim and Leveling
CP2	Cold Plane, 2" Overlay	SHM	Hot Mix Shim & Thin Overlay

Scenarios 2 & 3 - Additional Scheduled Major Structural Repair Projects
SANFORD MAINE

SCENARIO 2

Sunset Road-2	RC3	9	$35,772
Brompton StreetHM2	HM1.5	8	$24,427
Bateman Street	HM2	8	$14,990
Harvard Street	HM1.5	5	$6,916
East Street	RC3	6	$9,709
Riverview St	HM2	6	$10,902
Bridge Street	RC3	5	$28,678

TOTAL **$131,394**

SCENARIO 3

Kilby Street	HM1.5	2	$49,967
Sherburne St Sanford	HM1.5	1	$26,885
Montreal Street	HM1.5	9	$75,750
Hanson's Ridge Rd-3 *	RC3	1	$75,750
Sam Allen Road *	RC3	5	$353,059
Branch Road	RC3	5	$13,599
Front Street	SHM	2	$8,112
South Street	SHM	9	$25,467
Fremont Street	HM1.5	9	$6,359

TOTAL** **$634,949**

* Some roads originally scheduled for Years 2 and 5 were mover to other years for budgetary reasons

**Does not include roads that were just cracksealed or patched

Legend

RC3	Reclaim, 3" Hot Mix	18BS3	18" Base Replace, 3" Overlay
HM2	Hot Mix 2" Overlay	10BS3	10" Base Replace, 3" Overlay
HM1.5	Hot Mix 1.5" Overlay	SHL	Hot Mix Shim and Leveling
CP2	Cold Plane, 2" Overlay	SHM	Hot Mix Shim & Thin Overlay